

**Formulation of a discontinuous Galerkin method for unstructured causal grids in spacetime and linear dispersive electromagnetic media**

R. Abedi<sup>(1)</sup>, S. Mudaliar<sup>(2)</sup>

(1) University of Tennessee Space Institute, TN, 37355, <http://www.utsi.edu/>

(2) Air Force Research Laboratory, Sensors Directorate, Wright-Patterson AFB, Dayton, OH 45433-7318, USA

We present a spacetime discontinuous Galerkin formulation for time domain (TD) electromagnetics problem with local and asynchronous solution features. Using differential forms, we formulate the problem for arbitrary domains in spacetime and linear dispersive media. A novel recursive method is proposed to derive the auxiliary differential equations required for the analysis of dispersive media in TD. We present the method's energy stability proof, solutions for some TD benchmark problems, and convergence rate numerical verifications.